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Stollman

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(54) **METHODS AND APPARATUS RELATED TO DOCUMENT PROCESSING BASED ON A DOCUMENT TYPE**

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(51) **Int. Cl.**

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G06N 7/00	(2006.01)
G06N 7/08	(2006.01)

(52) **U.S. Cl.** **706/55**
(58) **Field of Classification Search** 706/55
See application file for complete search history.

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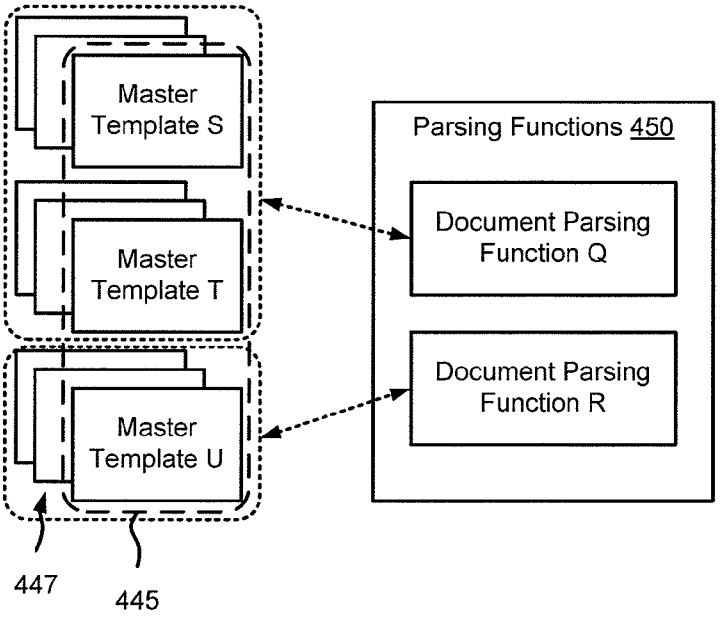
(57) **ABSTRACT**

In one embodiment, a method includes receiving a portion of text from a document. A document type is associated with the document based on at least one of the portion of text or an identifier associated with the document. The method also includes selecting, based on the document type, a document template having a plurality of sections. Each section from the plurality of sections being associated with a document category. At least one section from the plurality of sections including at least one policy preference.

30 Claims, 6 Drawing Sheets



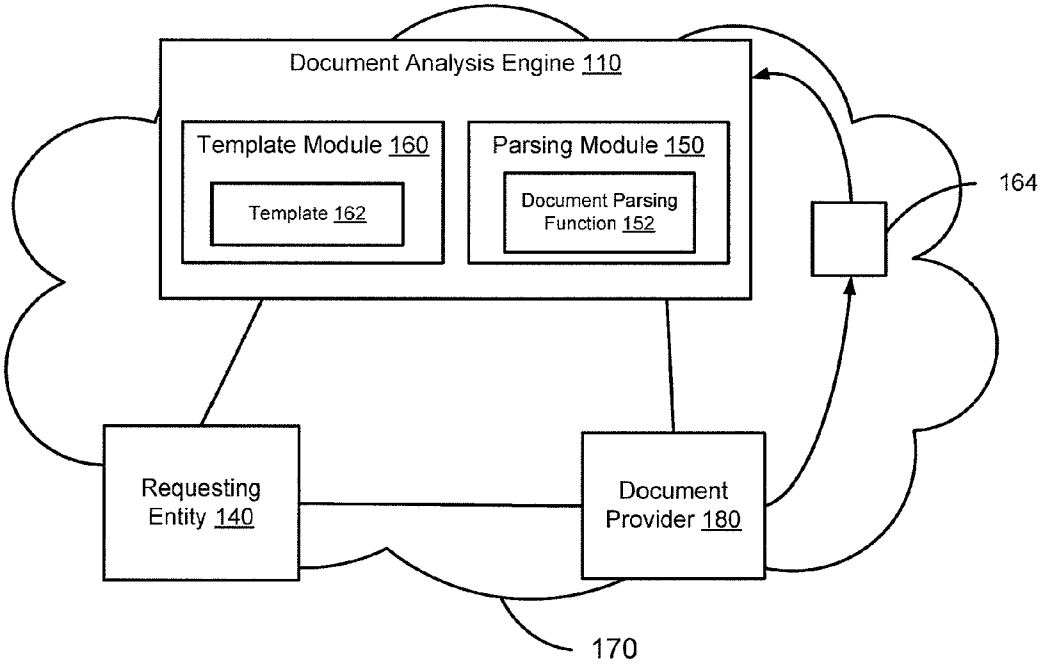

Document Analysis Engine 110
Template Module 160
Template 162
Parsing Module 150
Document Parsing Function 152
164
Requesting Entity 140
Document Provider 180
170

FIG. 1

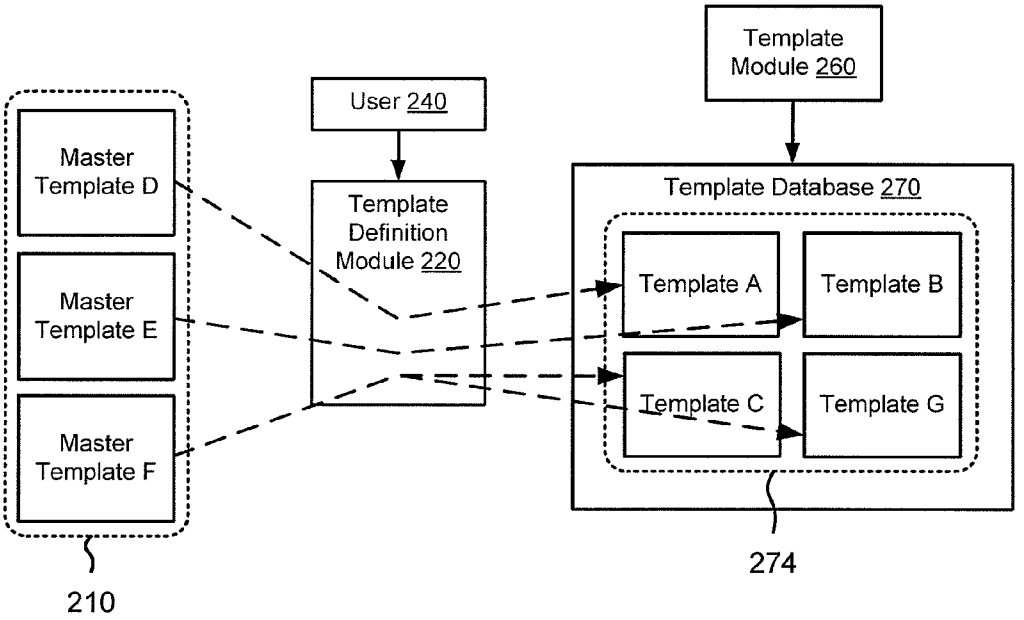

Template Module 260
User 240
Master Template D
Master Template E
Master Template F
Template Definition Module 220
Template Database 270
Template A
Template B
Template C
Template G
210
274

FIG. 2

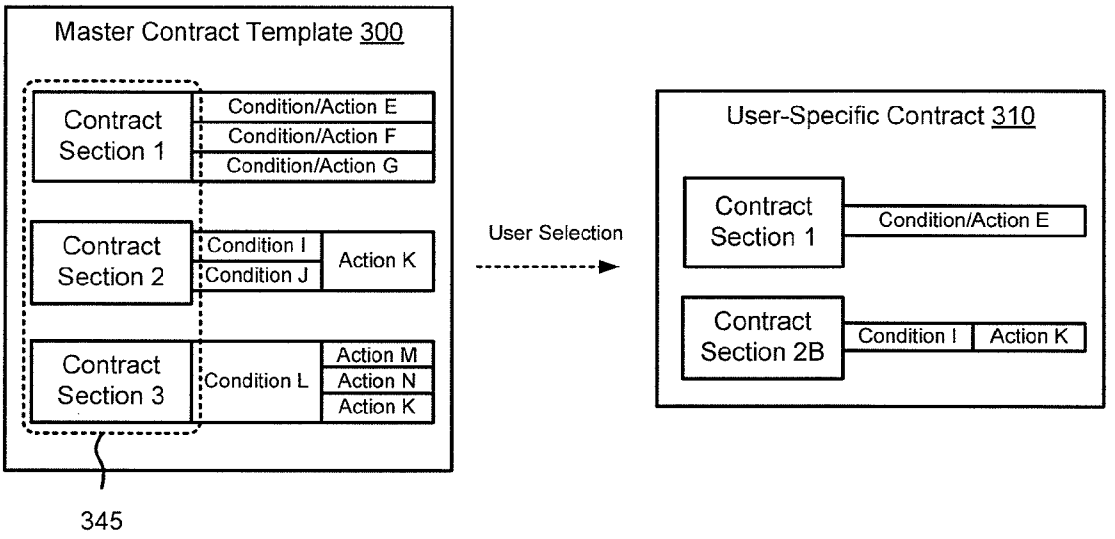

Master Contract Template 300
Contract Section 1
Condition/Action E
Condition/Action F
Condition/Action G
Contract Section 2
Condition I
Condition J
Action K
Contract Section 3
Condition L
Action M
Action N
Action K
345
User Selection
User-Specific Contract 310
Contract Section 1
Condition/Action E
Contract Section 2B
Condition I
Action K

FIG. 3

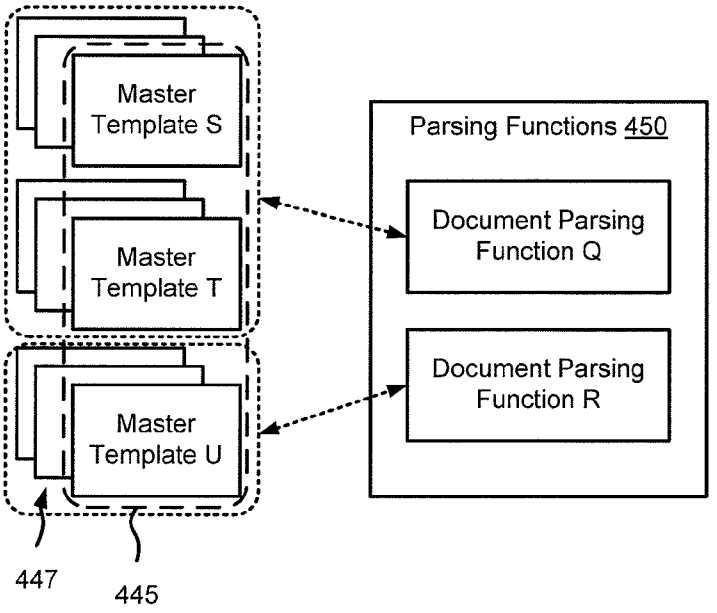

Master Template S
Master Template T
Master Template U
447
445
Parsing Functions 450
Document Parsing Function Q
Document Parsing Function R

FIG. 4

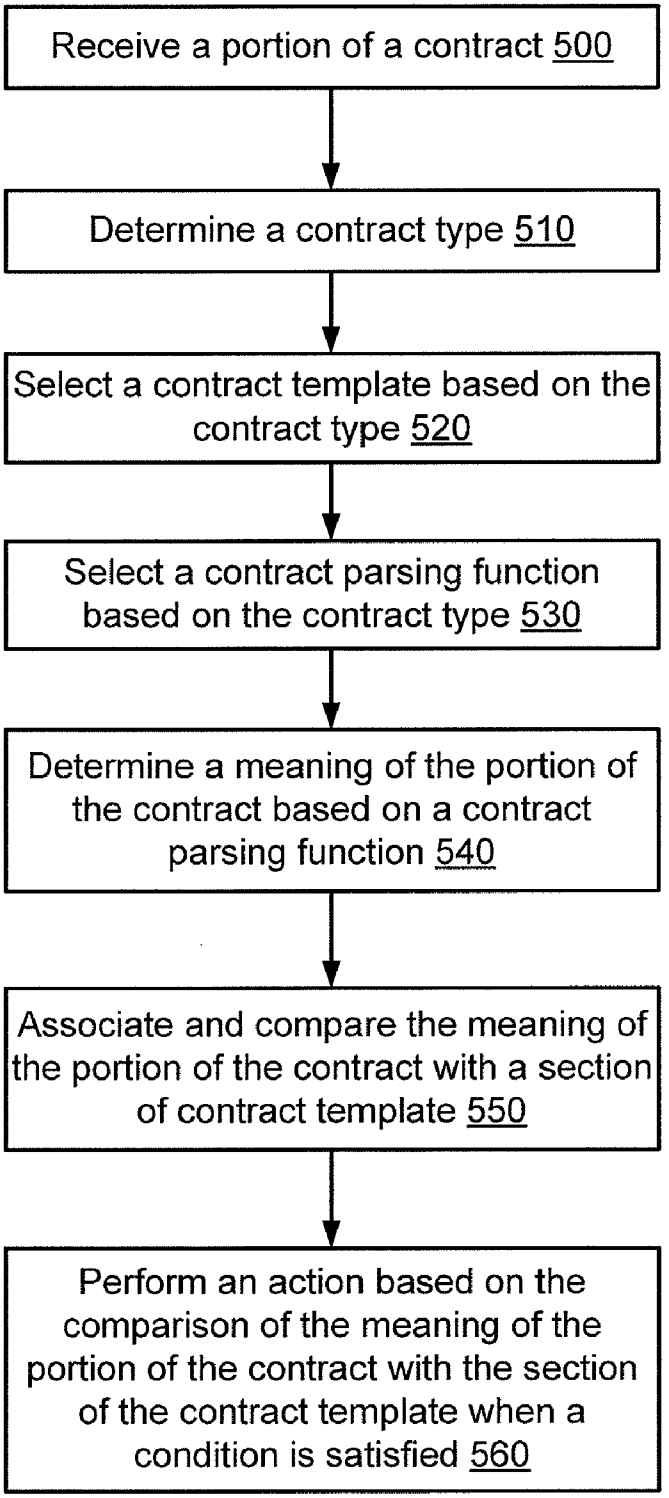

Receive a portion of a contract 500
Determine a contract type 510
Select a contract template based on the contract type 520
Select a contract parsing function based on the contract type 530
Determine a meaning of the portion of the contract based on a contract parsing function 540
Associate and compare the meaning of the portion of the contract with a section of contract template 550
Perform an action based on the comparison of the meaning of the portion of the contract with the section of the contract template when a condition is satisfied 560

FIG. 5

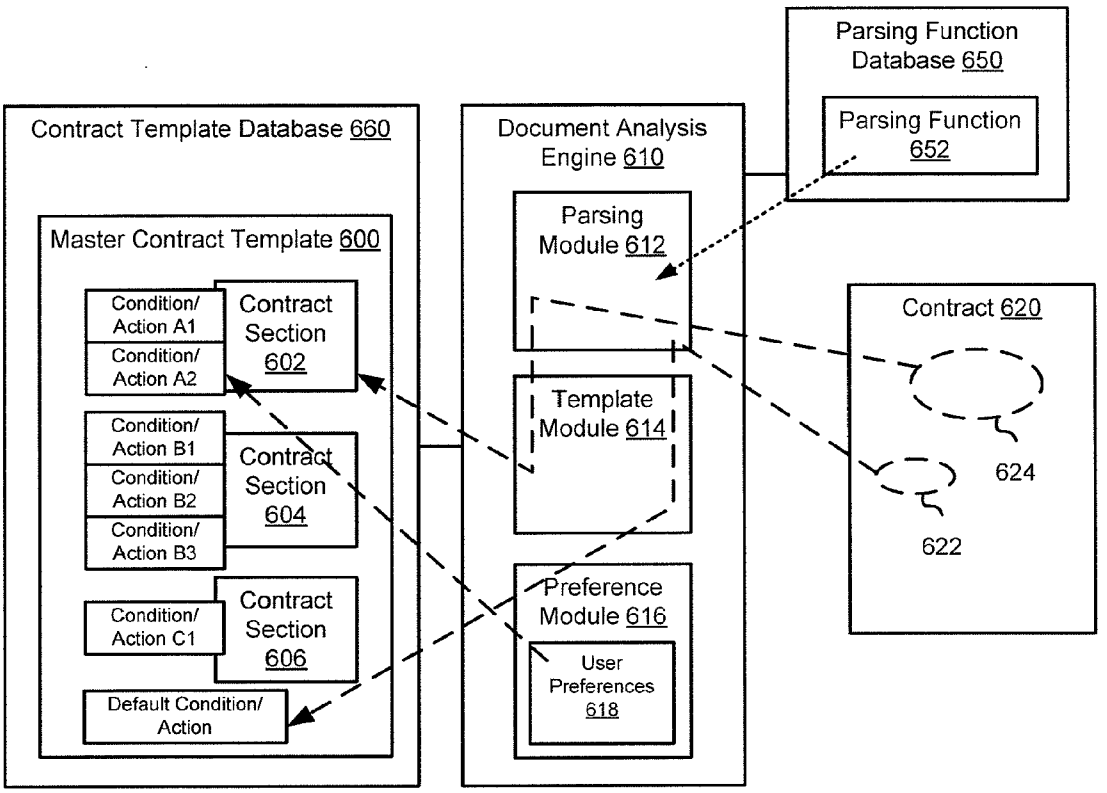

Parsing Function Database 650
Parsing Function 652
Contract Template Database 660
Document Analysis Engine 610
Master Contract Template 600
Parsing Module 612
Condition/ Action A1
Condition/ Action A2
Contract Section 602
Contract 620
Template Module 614
Condition/ Action B1
Condition/ Action B2
Condition/ Action B3
Contract Section 604
624
622
Preference Module 616
Condition/ Action C1
Contract Section 606
User Preferences 618
Default Condition/ Action

FIG. 6

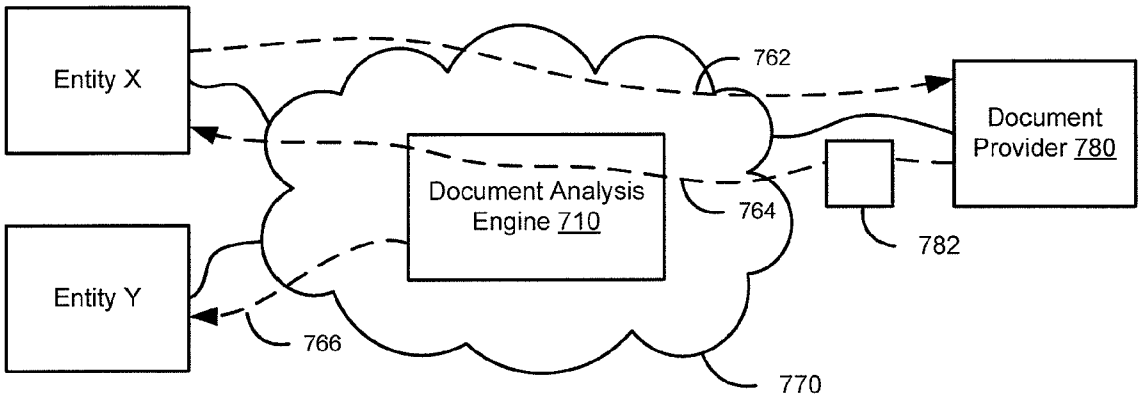

Entity X
Entity Y
Document Analysis Engine 710
762
764
766
770
782
Document Provider 780

FIG. 7

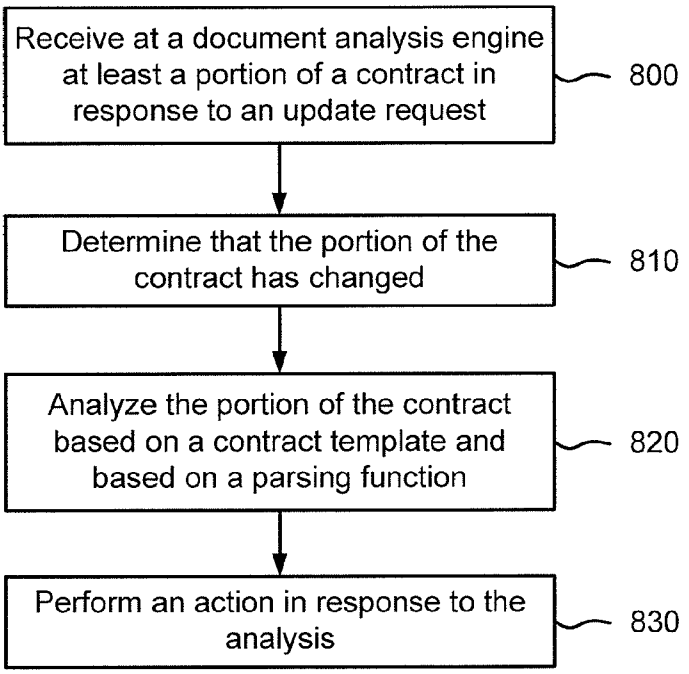

Receive at a document analysis engine at least a portion of a contract in response to an update request
800
Determine that the portion of the contract has changed
810
Analyze the portion of the contract based on a contract template and based on a parsing function
820
Perform an action in response to the analysis
830

FIG. 8

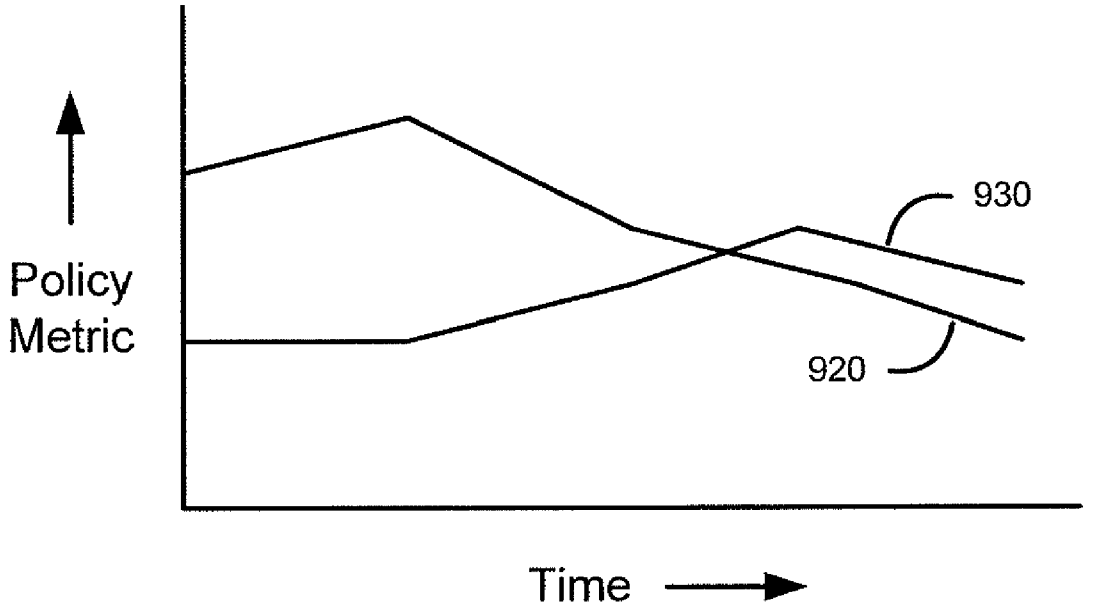


FIG. 9

METHODS AND APPARATUS RELATED TO DOCUMENT PROCESSING BASED ON A DOCUMENT TYPE

BACKGROUND

Embodiments relate generally to document processing, and, in particular, to methods and apparatus related to processing of at least a portion of a document based on a document template.

As society becomes more impersonal through such wide-area media as the world-wide web, it has become desirable to formally document rules of engagement between parties providing/using services of one another. This has led to an explosion of contractual documentation (often crafted by the service provider) to which parties must formally or impliedly agree in order to avail themselves of the products and/or services covered by such contracts. The need to approve and reconfirm lengthy and frequently changing documents including End-User-License Agreements (EULAs), Terms and Conditions, and Privacy Policies often poses such an imposition on productivity that many users agree to the terms of such contracts without taking the time to read them and understand the obligations and restrictions imposed by them. Often, users are uncomfortable with this exposure, but take such risks because of the burden of having to read and understand these contracts which can be lengthy and filled with legalese that a typical user may not understand—even if they take the time to read the document in its entirety.

Thus, a need exists for methods and apparatus for processing at least a portion of a document based on a document template.

SUMMARY

In one embodiment, a method includes receiving a portion of text from a document. A document type is associated with the document based on at least one of the portion of text or an identifier associated with the document. The method also includes selecting, based on the document type, a document template having a plurality of sections. Each section from the plurality of sections being associated with a document category. At least one section from the plurality of sections including at least one policy preference.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic block diagram that illustrates a document analysis engine configured to process a document, according to an embodiment.

FIG. **2** is a schematic block diagram that illustrates templates defined by a user using a template definition module, according to an embodiment.

FIG. **3** is a schematic block diagram that illustrates a user-specific contract template defined based on a master contract template, according to an embodiment.

FIG. **4** is a schematic block diagram that illustrates a set of document parsing functions associated with a set of master templates and associated with a set of customized templates, according to an embodiment.

FIG. **5** is a flowchart that illustrates a method for analyzing a portion of a contract based on a contract template, according to an embodiment.

FIG. **6** is a schematic block diagram that illustrates a document analysis engine configured to analyze portions of a contract, according to an embodiment.

FIG. **7** is a schematic block diagram that illustrates a document analysis engine configured to communicate with a first entity in response to an analysis of a document requested by a second entity, according to an embodiment.

FIG. **8** is a flowchart that illustrates a method for analyzing a portion of a contract in response to an update request, according to an embodiment.

FIG. **9** is a schematic graph that illustrates a trend of two policy metrics versus time, according to an embodiment.

DETAILED DESCRIPTION

A document analysis engine can be configured to process, in response to a request from a user, a portion of a document based on a document template. Specifically, the document analysis engine can be configured to compare a section of the document template to the portion of the document based on an interpretation of the portion of the document using a parsing function. The parsing function can be configured to interpret the portion of the document based on an ontology and/or a semantic rule. In some embodiments, an action can be performed and/or triggered based on whether the comparison satisfies a threshold condition. Moreover, the document analysis engine can function as a policy filter on behalf of the user by applying policies defined within the document template. In some embodiments, a condition/action combination can be referred to as a policy preference.

In some embodiments, the document template can be customized by a user and/or can be defined based on a master template. In some embodiments, the document template and/or the parsing function can be selected based on an identifier and/or a term associated with the document template. In some embodiments, the document can be associated with target content requested for, for example, viewing by the user.

In some embodiments, the actions performed and/or triggered can be based on a comparison of a document template with a document that is associated with target content. For example, if the document is a contractual document associated with target content requested by the user (e.g., an End-User-License Agreement (EULA) or a privacy policy associated with a web page), the document analysis engine can be configured to determine based on a parsing module and a user-defined template whether or not a specified portion of the document would be acceptable to the user. In some embodiments, the document analysis engine can be configured to identify portions of the document that should be reviewed by the user. In some embodiments, the document analysis engine can be configured to restrict or allow access to the target content based on the analysis of the document.

It is noted that, as used in this written description and the appended claims, the singular forms "a," "an" and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, the term "a template" is intended to mean a single template or a combination/collection of templates. Also, many of the embodiments are described in connection with processing of contracts by way of example only. Any of the embodiments described herein can be generally applied to the processing (e.g., analysis) of any type of document.

FIG. **1** is a schematic block diagram that illustrates a document analysis engine **110** configured to process (e.g., analyze) a document **164**, according to an embodiment. The document **164** (or portion of a document) can be delivered to the document analysis engine **110** from a document provider **180** over a network **170** in response to a request from a requesting entity **140** (e.g., a computing entity such as a mobile device, personal computer, or a server that can be

controlled a (human) user). Specifically, the document analysis engine **110** can be configured to interpret (and associate an interpretation with) at least a portion of the document **164** using a parsing module **150**. The document analysis engine **110** can also be configured to perform (and/or trigger) an action associated with the document **164** based on a comparison of the interpretation (e.g., the meaning) of the portion of the document **164** with one or more sections included in a template **162** using a template module **160**. In some embodiments, the interpretation can also be referred to as a meaning.

In some embodiments, the document **164** can be defined based on one or more types of documents such as, for example, a contract (e.g., a lease contract, a EULA, a terms and conditions contract, a real property contract, etc.), a book (e.g., a compilation), an article (e.g., a publication, a journal article, a newspaper article), a user manual, a technical reference document, a compliance report, and so forth. In some embodiments, the document **164** can include text (e.g., digitized text, digitized text acquired from a web page) and/or media (e.g., images (maps, photos, technical drawings, flowcharts, etc.), video, audio). In some embodiments, the document **164** can be processed, for example, by the document analysis engine **110** so that the document **164** can be electronically processed by the document analysis engine **110**. In some embodiments, the document **164** can be an entire document (or multiple documents) or a portion of a document (or a portion of multiple documents).

One or more sections within the template **162** used during analysis of the document **164** can include text (e.g., digitized text) and/or media (e.g., images, video, audio). In some embodiments, the sections within a template can be defined so that they correspond with one or more sections associated with the document **164**. In some embodiments, the template **162** can include sections that typically appear in a particular type of document identified for analysis using the document analysis engine **110**.

In some embodiments, a section within the template **162** can include key words that can be used by the template module **160** during comparison of the section of the template **162** with the document **164**. In some embodiments, the key words can be in a particular order and/or can be related according to specified semantic rules.

In some embodiments, the template **162** can included standardized sections and/or customized sections defined by, for example, a user (e.g., the requesting entity **140**). In other words, one or more sections of the template **162** can include standardized language adopted by, for example, a governing body or organization. Accordingly, the document **164** can be compared with standardized language included in the template **162**.

The parsing module **150** can be configured to interpret (e.g., determine a meaning for, extract a meaning from) the document **164** based on one or more document parsing functions such as document parsing function **152** shown in FIG. **1**. Specifically, the document parsing function **152** can be configured to parse at least a portion of text and/or a portion of a media object (e.g., an image, a video, an audio snippet) from the document **164**. The document parsing function **152** can be configured to interpret one or more portions, or groups of one or more portions, parsed from the document **164**.

In some embodiments, the document parsing function **152** can include, for example, language processing portions (e.g., language processing functional portions) that are defined based on one or more ontological structures and/or one or more semantic rules. The ontological structure(s) and/or the semantic rule(s) included within the language processing portion(s) of the document parsing function **152** can be used by the parsing function to interpret a portion of a document **164**. In some embodiments, the interpretation can be based on probabilistic rules (e.g., probabilistic matching with an interpretation) encoded within the document parsing function **152**. In some embodiments, the document parsing function **152** can be configured to interpret the document **164** based on natural language processing techniques.

In some embodiments, the document parsing function **152** can include, for example, various tools that can be used by the parsing module **150** to process (e.g., physically process) the document **164**. For example, the document parsing function **152** can include an optical character reader (OCR) function that can be used to convert text and/or media included in a paper document into an electronic format that can be processed by the document analysis engine **110**. In some embodiments, for example, the document parsing function **152** can include a speech detection/recognition system that can translate propagating sound waves and/or digitized representations of sound waves (e.g., speech, music) to text that can then be processed by the document analysis engine **110**.

In some embodiments, the document parsing function **152** of the parsing module **150** can be configured to parse the document **164** (e.g., parse text and/or media included in the document) into sections that correspond with sections included within a template **162**. In some embodiments, the document parsing function **152** can be configured to rearrange (e.g., move, combine) portions of the document **164** so that they correspond with sections included within a template **162**. In other words, the document parsing function **152** can be configured to prepare the document for comparison with the template **162**. In some embodiments, for example, portions of the document **164** can be rearranged by the parsing module **150** based on semantic relationships between words and/or the relationships between sections within the template **162**. Accordingly, interpretations can be associated with rearranged portions of the document **164** (e.g., new portions of the document that are defined based on original portions of the document **164** that have been parsed and combined into the new portions). Moreover, the template **162** and the document parsing function **152** can be defined so that they are compatible with (e.g., consistent with, customized for) one another. More details related to parsing functions are discussed in connection with FIG. **4**.

One or more sections within the template **162** can be associated with one or more conditions and/or actions that can be performed (triggered) based on whether or not the conditions are satisfied. For example, template **162** can include one or more template sections that can be associated with one or more conditions and/or one or more actions. In some embodiments, the sections of the template **162** and associated conditions/actions can collectively be referred to as a template-policy. In some embodiments, multiple conditions can correspond with an action and/or multiple actions can correspond with a condition. In some embodiments, a condition/action combination can be referred to as a policy preference.

Specifically, one or more actions can be performed (and/or triggered) by the template module **160** based on a comparison of a section of template **162** with the interpretation of a portion of the document **164** by the parsing module **150**. For example, the template module **160** can be configured to perform (and/or trigger) an action based on whether or not a comparison of an interpretation associated with a portion(s) of the document with a section within the template **162** satisfies one or more criteria. Although not shown, in some embodiments, the actions performed (and/or triggered) by the

document analysis engine **110** can be defined in a database (e.g., a template database) that can be accessed by the template module **160**.

In some embodiments, the actions that can be performed (and/or triggered) by the template module **160** in response to a comparison of a portion of the template **162** (e.g., a section) with the interpretation of the document **164** by the parsing module **150** can be, for example, blocking and/or allowing access to (e.g., viewing privileges to, editing privileges to) one or more portions of the document **164** by the requesting entity **140**. In some embodiments, the document analysis engine **110** can be configured to identify certain portions of the document **164** that may require further review, for example, by the requesting entity **140**. In some embodiments, if the document **164** is a contract, the document analysis engine **110** can be configured to identify one or more terms or sections associated with the contract that should be accepted or rejected. In some embodiments, the document analysis engine **110** can be configured to suggest changes to the document **164** based on the processing of the document **164**. In some embodiments, the document analysis engine **110** can be configured to send a notification to, for example, the requesting entity **140** based on the content of the document **164**.

In some embodiments, the document analysis engine **110** can be configured to provide an assessment of the document **164** to the requesting entity **140**. For example, if the document is a contract, the document analysis engine **110** can identify portions of the document **164** as more restrictive, or less restrictive, than specified sections of the template **162**.

In some embodiments, the document analysis engine **110** (e.g., the template module **160** of the document analysis engine **110**) can provide options with respect to any of the actions, for example, to the requesting entity **140**. In some embodiments, providing an option can be considered (or encoded as) an action. For example, the document analysis engine **110** can be configured to provide options with respect whether or not to block/allow access to a specified portion(s) of the document **164** and/or options with respect to accepting/denying a specified portion(s) of the document **164**. In some embodiments, the options (and/or actions) can be accompanied by information defined based on the processing of the document **164** by the document analysis engine **110**. For example, one or more options can be accompanied by a highlighted portion and/or an interpretation (e.g., a meaning) of a specified portion(s) of the document **164** as determined by the document analysis engine **110**. More details related to conditions and/or actions as related to templates are discussed in connection with FIGS. **3** and **5**.

In some embodiments, the template **162** (e.g., sections of the template **162** with associated conditions and/or actions, sections of the template **162** associated with a policy preference) can be defined based on one or more master templates (also can be referred to as master document templates). In some embodiments, the template **162** can be stored in a template database (not shown) where the template **162** can be accessed by the template module **160**. In some embodiments, the template **162** can be defined, at least in part, based on one or more preferences of the requesting entity **140** and/or a different entity (not shown) than the requesting entity **140**. In some embodiments, the template **162** (or a portion of the template **162**) can be applied to only a portion of the document **164** by the template module **160** based a user preference (e.g., a policy, a condition). More details related to templates are discussed in connection with FIGS. **2** through **9**.

In some embodiments, the document parsing function **152** (or a portion thereof) and/or the template **162** (e.g., a section with associated conditions and/or actions) can be selected (for use in processing the document **164**) based on one or more identifiers and/or one or more terms associated with the document **164**. For example, an identifier, such as an electronic tag (e.g., metadata, a link) and/or one or more terms (e.g., a title/heading, a paragraph) associated with one or more portions of the document **164** (e.g., the entire document **164**), can be received, interpreted, and used by the document analysis engine **110** to select the document parsing function **152** and/or the template **162** (or template-policy). The identifier(s) and/or term(s) can be received by the document analysis engine **110** in response to a request from the document analysis engine **110** and/or extracted from one or more portions of the document **164** (and/or data associated with the document **164**).

For example, the document parsing functions **152** (or a portion thereof) used by the parsing module **150** and/or the template **162** (or a portion thereof) used by the template module **160** to process the document **164** can be selected based on a document type associated with the document **164** based on analysis of an identifier and/or a term from the document **164**. For example, if one or more portions of the document **164** is identified as being defined based on a EULA document type, the parsing module **150** can be configured to determine a meaning of the portion(s) of the document **164** based on a parsing function (such as document parsing function **152**) corresponding with a EULA document type. Likewise, the template module **160** can be configured to apply one or more templates (such as template **162**) based on the portion (s) of the document **164** being defined based on a EULA document type. In some embodiments, the document analysis engine **110** can be configured to present an option (e.g., an option in a prompt) to the requesting entity **140** (or a different entity) to accept (e.g., confirm) or reject the selection (or portions of the selection) of the template(s) and/or document parsing function(s). In some embodiments, the document analysis engine **110** can be configured so that the requesting entity **140** (or a different entity) can manually make a selection (or override an automatic selection by the document analysis engine **110**) of a document parsing function(s) and/or a template(s).

In some embodiments, the identifier(s) and/or the term(s) associated with one or more portions of the document **164** can be received, interpreted, and used during a preliminary processing time period so that the document parsing function **152** and/or a template **162** (or template-policy) can be selected. In other words, the document parsing function **152** and/or the template **162** can be selected from a library of document parsing functions (not shown in FIG. **1**) and/or a library of templates (not shown in FIG. **1**), respectively, based on analysis of an identifier(s) and/or a term(s) associated with the document **164**. In some embodiments, the preliminary processing can be performed based on a default (or generalized) document parsing function (not shown) and/or a default (or generalized) template (not shown). After the document parsing function **162** and the template **152** have been selected, the document parsing function **162** can be used by the parsing module **150** and/or the template **152** can be used by the template module **160** to process the portion(s) of the document **164** during a secondary processing time period.

In some embodiments, processing of the document **164** can be performed in an iterative fashion by the document analysis engine. For example, in some embodiments, analysis of the document **164** by the template module **160** and/or the parsing module **150** can be performed iteratively to refine an analysis of the document **164**. In some embodiments, the iterative processing by the template module **160** can be performed based on different templates (not shown) during different

iterations. In some embodiments, the iterative processing by the document parsing function **152** can be performed based on different document parsing functions (not shown) during different iterations. In some embodiments, the document parsing functions and/or the templates can be selected based on threshold conditions defined by, for example, the requesting entity **140**.

In some embodiments, a first analysis of a document **164** may produce a first level of results (e.g., a hierarchical categorization). A second analysis of the document **164** may produce a second level of results based on or unrelated to the first level of results. The first analysis and the second analysis can be performed by the document analysis engine **110** using different or same templates and/or different or same document parsing functions. In some embodiments, the document analysis engine **110** can be configured to analyze the document **164** multiple times and prompt a user (e.g., the request entity **140**) to select one or more of the results of the analysis.

Although not shown in FIG. **1**, in some embodiments, the parsing module **150** and/or the template module **160** can apply different document parsing functions (or portions thereof) and different templates (or portions thereof) to different portions of the document **164**. For example, if the document analysis engine **110** determines that a first portion of the document **164** corresponds with a EULA (e.g., is a EULA document type) and that a second portion of the document **164** corresponds with a real estate contract (e.g., is a real estate contract document type), the first portion of the document **164** can be processed based on a document parsing function associated with the EULA and the second portion of the document **164** can be processed based on a document parsing function associated with the real estate contract.

In some embodiments, one or more document parsing functions and/or one or more templates can be selected based on a preference of a user such as the requesting entity **140**. For example, the user can define a priority preference that can be used by the document analysis engine **110** to select one or more templates over another template, or to select one or more document parsing functions over another document parsing function. In some embodiments, one or more document parsing functions and/or templates can be customized and associated with an identifier associated with the requesting entity **140**. In other words, the customized document parsing functions and/or templates can be associated with the requesting entity **140** using the identifier. In response to a request from the requesting entity **140** to process the document **164**, the document analysis engine **110** can use the identifier to fetch the customized document parsing functions and/or templates so that the document **164** can be processed based on the customized document parsing functions and/or templates.

In some embodiments, the document **164** can be associated with target content (not shown), and processing of the document **164** can be triggered in response to a request by the requesting entity **140** to access the target content. For example, the target content can be an application that can be downloaded or associated with a webpage (e.g., content included within a webpage), and the document **164** can be a terms and condition contract and/or EULA associated with (e.g., referenced in, linked to) the target content. In some embodiments, one or more portions of the target content can be analyzed in addition to the document **164** (in which case, the target content can be referred to as a document).

Any of the actions and/or options (which can be actions) performed (and/or triggered) by the document analysis engine **110** with respect to the document **164** can be applied to the target content as well. For example, the document analysis engine **110** (e.g., the template module **160** of the document analysis engine **110**) can, for example, block and/or allow access (by the requesting entity **140** or a different entity) to one or more portions of the target content based on processing of the document **164**. In some embodiments, if the document **164** is a contract, the document analysis engine **110** can be configured to identify one or more terms or sections associated with the contract that could/should be accepted or rejected before the target content is accessed. In some embodiments, the document analysis engine **110** can be configured to send a notification to, for example, the requesting entity **140** about the target content based on the content of the document **164** associated with the target content.

In some embodiments, an identifier and/or term that can be used to select the document parsing function **152** (e.g., select from a library of document parsing functions) and/or the template **162** (e.g., select from a library of templates) can be associated with the target content. For example, the identifier and/or term can be associated with a link (e.g., a hyperlink, a universal resource locator (URL)) (if the target content is a webpage) used to access the target content or included within the target content.

In some embodiments, one or more portions of the document analysis engine **110** can be a hardware-based module (e.g., a digital signal processor (DSP), a field programmable gate array (FPGA)) and/or a software-based module (e.g., a module of computer code, a set of processor-readable instructions that can be executed at a processor (which could be associated with a memory)). In some embodiments, for example, the document analysis engine **110** can be encoded within an application (e.g., a java based application, a web-based application) that can be installed on and/or served to, for example, a personal computer. Any of the operations (e.g., functions) performed by the document analysis engine **110** can be included within one or more modules. For example, one or more operations performed by the parsing module **150** and/or the template module **160** can be combined into a single module or divided in multiple modules (including modules that are not shown).

Although not shown, in some embodiments, the document analysis engine **110** can be made available as a web service. For example, the document analysis engine **110** can be invoked via a web browser. In some embodiments, the document analysis engine **110** can be accessed via an account (e.g., a user account) associated with, for example, a requesting entity. In some embodiments, the functionality associated with the document analysis engine **110** can be made available and invoked via an application programming interface (API).

In some embodiments, any of the operations performed by the document analysis engine **110** can be manually triggered by, for example, the requesting entity **140** (or a different entity). In some embodiments, any of the operations performed by the document analysis engine **110** can be triggered by an entity (not shown) other than the requesting entity **140**. For example, the actions and/or options can be presented to an entity different than the requesting entity **140**. In some embodiments, one or more portions of templates (such as template **162**) and/or document parsing functions (such as document parsing function **152**) can be defined by an entity different than the requesting entity **140**.

In some embodiments, the document provider **180** can be any entity that can send (e.g., transmit, provide) the document **164** to the document analysis engine **110** for processing. In some embodiments, the document provider **180** can be configured to send the document **164** to the document analysis engine **110** in a format and/or based on a protocol that can be compatibly processed by the document analysis engine **110**.

In some embodiments, the document analysis engine **110** can have one or more modules configured to convert (e.g., translate) the document **164** into a format (e.g., a protocol) that can be compatibly processed by the document analysis engine **110**. In some embodiments, the document provider **180** can be, for example, a wired device and/or a wireless device such as, for example, a computing entity (e.g., a personal computing device), a mobile phone, a personal digital assistant (PDA), and/or a server (e.g., a web server/host).

The network **170** can be, for example, a local area network (LAN) and/or a wide area network (WAN). In some embodiments, the network **170** can include one or more wired and/or wireless segments. Although not shown, the document analysis engine **110**, the document provider **180** and/or the requesting entity **140** can be included within a single computing environment (e.g., a personal computer). Although not shown, in some embodiments, a document can be received at a computer via, for example, a universal serial bus (USB) port or a different port (e.g., firewire port). The document can be scanned via a scanner and transmitted to the computer via the USB port. The document can be analyzed by a document analysis engine installed at or accessed from (e.g., via a network) the computer.

In some embodiments, the document analysis engine **110** can be configured to analyze documents that include text and/or images related to various languages and/or cultures. In some embodiments, for example, the document parsing function **152** can be configured to translate one or more portions of the document **164** for comparison with a section of the template **162**.

In some embodiments, any portion of the document analysis engine **110** can be configured to allow for, prompt and/or require human interaction (e.g., intervention). For example, the document analysis engine **110** can be configured to prompt a user for approval by the user or manual intervention (e.g., editing, selection) by the user for any action taken by the document analysis engine **110**.

FIG. **2** is a schematic block diagram that illustrates templates **274** defined by a user **240** using a template definition module **220**, according to an embodiment. The templates **274** can be referred to as a set of templates **274** or as a library of templates **274**. The templates **274** are defined based on master templates **210** and, in some embodiments, each of the templates **274** can be referred to as a child template or a customized template. The templates **274** include template A, template B, and template C, and the master templates **210** include master template D, master template E, and master template F. For example, in this embodiment, template A is defined by the user **240** via a template definition module **220** based on master template D. Also, in this embodiment, template C and template G are defined by the user **240** via a template definition module **220** based on master template F. In some embodiments, the user **240** can be a requesting entity. In some embodiments the templates **210** can be referred to as user-specific templates **210**.

In this embodiment, the templates **274** are included in a template database **270** that can be accessed by a template module **260**. In some embodiments, the template database **270** can be stored in a memory such as a local memory (e.g., a hard drive, a random-access memory (RAM)) and/or a distributed database that can be accessed, for example, via a network.

Each of the templates **274** can include conditions and/or actions (e.g., a policy preference) that can be used by the template module **260** when processing one or more portions of a document (such as document **164** shown in FIG. **1**). In some embodiments, the templates **274** can include references (e.g., pointers) back to the master templates **210** (and/or conditions and/or actions included within the master templates **210**). In such embodiments, the master templates **210** (and/or associated conditions/actions) can be stored in a location(s) (e.g., at the document analysis engine **110**) where they can be accessed by the template module **260** when processing a document.

Although not shown, in some embodiments, the template definition module **220** can be included within a document analysis engine (such as the document analysis engine **110** shown in FIG. **1**). Accordingly, the document analysis engine can be used to not only define a template (and associated actions/conditions), but also can be used to process (e.g., analyze) a document based on the template.

FIG. **3** is a schematic block diagram that illustrates a user-specific contract template **310** defined based on a master contract template **300**, according to an embodiment. The master contract template includes three contract sections **345**, contract section **1**, contract section **2**, and contract section **3**, that are each associated with various combinations of conditions and actions (policy preferences). Contract section **1** in the master contract template **300** is associated with three different condition/action combinations E, F, and G. Contract section **2** has two conditions—condition I and condition J—associated with a single action K. Contract section **3** has a single condition L associated with three different actions M, N, and K.

The contract sections **345** can include text (e.g., digitized text) and/or media (e.g., images, video, audio) associated with different provisions and/or clauses of a contract. For example, the provisions (which can also be referred to as categories) can include, for example, a severability provision (or clause), a choice of law provision (or clause), a warranty provision (or clause), an indemnification provision (or clause), a confidentiality provision (or clause), and so forth.

As shown in FIG. **3**, the user-specific contract template **310** includes a subset of the contract sections **345** and conditions/actions from the master contract template **300**. Specifically, the user-specific contract template **310** includes contract section **1**, which is associated with condition/action E, and contract section **2**B, which is associated with condition I and action K. In this embodiment, contract section **2**B is a modified version of contract section **2**. Contract section **3** from the master contract template **300** is not included in the user-specific contract policy **310**.

As indicated in FIG. **3**, the user-specific contract template **310** is defined based on selections by a user from the master contract template **300**. In some embodiments, the selections by the user can be performed via a template definition module such as template definition module **220** shown in FIG. **2**. In some embodiments, modifying one or more of the contract sections **345** (such as the modification of contract section **2** into contract section **2**B) when defining a user-specific contract policy may not be allowed.

In some embodiments, a set of policy preferences (condition/action pairs) can be defined based on a global selection by a user. For example, condition/action E, condition J/action K, and condition L/action M can be selected and used to define a user-specific contract (not shown) based on a single selectable link to this set of policy preferences.

FIG. **4** is a schematic block diagram that illustrates a set of document parsing functions **450** associated with a set of master templates **445** and associated with a set of customized templates **447**, according to an embodiment. Each template from the set of customized templates **447** is defined based on at least one template from the set of master templates **445**. Document parsing function Q is associated with master tem-

plate S (and customized templates defined based on master template S) and master template T (and customized templates defined based on master template T), and document parsing function R is associated with master template U (and customized templates defined based on master template U).

In some embodiments, each of the master templates **445** can be defined based on a document type. In some embodiments, the master templates **445** can be defined based on ontologies and/or semantic rules used to define the parsing functions **450**. For example, parsing function R and master template U (e.g., sections within the master template U and T), which is associated with parsing function R, can be defined based on ontologies and/or semantic rules defined for processing a EULA. In other words, the document templates (e.g., the master templates **445** and customized templates **447**) can be defined so that they are compatible with (e.g., consistent with) the analytical processes encoded within the parsing functions **450**. Accordingly, if a document selected for analysis is a EULA, parsing function R and master template U can be used to analyze the EULA.

FIG. **5** is a flowchart that illustrates a method for analyzing a portion of a contract based on a contract template, according to an embodiment. In some embodiments, the method can be implemented using, for example, a document analysis engine. As shown in FIG. **5**, a portion of a contract is received at **500**. The portion of the contract associated with the contract can be received in response to a request from a user (e.g., a requesting entity) and can include text and/or media. The portion of the contract can be associated with, for example, web content served from a web server. In some embodiments, the portion of the contract can be a term within the contract, can be a provision of the contract, can be the entire contract, can be associated with multiple contracts, and so forth.

As shown in FIG. **5**, a contract type is determined at **510**. In some embodiments, the contract type can be determined based a term (e.g., a single word, a collection of words) and/or based on an identifier associated with the portion of the contract.

If a contract type cannot be determined at **510**, an action can be performed and/or triggered. For example, in some embodiments, a user can be notified that the portion of the contract cannot be analyzed. In some embodiments, one or more portions of the portion of the contract can be provided to the user and/or the user can be prompted to make a manual decision with respect to the portion of the contract. In some embodiments, the user can trigger, for example, a document analysis engine to ignore the portion of the contract cannot be analyzed. In some embodiments, the user may not be notified that a contract type could not be determined and/or the portion of the contract can be automatically handled, for example, by a document analysis engine. For example, a document analysis engine can be configured to automatically ignore portions of the portion of the contract that cannot be analyzed.

A contract template is selected based on the contract type at **520**. In some embodiments, the contract template can be a contract template defined based on a master contract template. The contract template can include one or more sections that can be associated with conditions and/or actions.

A contract parsing function is selected based on the contract type at **530**. In some embodiments, the contract parsing function can be selected based on the contract template that is selected at **520**. In other words, a contract parsing function corresponding with the contract template can be automatically selected when the contract template is selected.

In some embodiments, a user can be notified if a contract template and/or a contract parsing function cannot be associated with the portion of the contract. For example, if a contract template for the particular contract type has not been created by the user, the user can be notified that a contract template could not be identified. In such instances, a document analysis engine, for example, can be configured to automatically ignore the portion of the contract, analyze the portion of the contract based on a different contract template (e.g., a default contract template) and/or different contract parsing function (e.g., a default contract parsing function), provide the user with options (e.g., manually triggered options) for handling the scenario (e.g., options for ignoring the portion of the contract, etc.), and so forth.

A meaning for the portion of the contract is determined based on the contract parsing function at **540**. In other words, the portion of the contract can be interpreted based on the contract parsing function. If the portion of the contract includes text, the meaning can be determined based on one or more ontologies associated with the contract parsing function and/or one or more semantic rules associated with the contract parsing function. In some embodiments, the one or more ontologies can be defined specifically for the contract type.

The meaning of the portion of the contract is associated and compared with a section of the contract template at **550**. The section can be associated with a contractual provision or a contractual term (e.g., a single word that defines a term, a collection of words that define a term).

In some embodiments, if a meaning for at least a portion of the portion of the contract cannot be desirably determined (e.g., determined within a specified threshold accuracy) based on the contract parsing function at **540** and/or the meaning cannot be associated with a section of the contract template at **550**, one or more actions can be performed and/or triggered. For example, in some embodiments, a user can be notified of the issue via, for example, a user-interface prompt. In some embodiments, the portion of the contract (or a portion of the portion of the contract) that could not be interpreted can be automatically ignored. In some embodiments, a user can be presented with one or more portions of the portion of the contract that could not be analyzed (e.g., interpreted) and/or can be presented with options (e.g., manually triggered options) for handling the portion of the contract (e.g., options for ignoring the portion of text, etc.). In some embodiments, the portion of the contract can be analyzed based on one or more different contract parsing functions until, for example, a meaning for the portion of the contract can be determined.

An action is performed based on the comparison of the meaning of the portion of the contract with the section of the contract template when at least one condition is satisfied at **560**. For example, access to (e.g., viewing privileges to, editing privileges to) one or more portions of content associated with the portion of the contract can be automatically blocked and/or allowed if the comparison of the section of the contract template with the portion of the contract satisfies the condition(s). For example, if the meaning of the portion of the contract is substantially different than the section of the contract template, a user can be notified and/or a change to the portion of the contract can be suggested. In some embodiments, if the meaning of the portion of the contract is substantially different than the section of the contract template, a user can be prevented from viewing content associated with the portion of the contract.

Although FIG. **5** is a flowchart related to analysis of a portion of a contract, in some embodiments, the flowchart can be used to analyze text and/or media that can be associated with different types of documents such as a book or a journal article. In some embodiments, one or more portions of the method can be performed in a different order and/or can require human interaction in order to proceed. For example,

in some embodiments, the contract parsing function can be selected based on the contract type (shown at **530**) before the contract template is selected based on the contract type (shown at **520**). In such instances, the contract template can be selected based on the contract parsing function that is selected. In some embodiments, the contract template must be approved by a user before the contract template is used to analyze one or more portions of the contract.

FIG. **6** is a schematic block diagram that illustrates a document analysis engine **610** configured to analyze portions of a contract **620**, according to an embodiment. Specifically, portion **624** and portion **622** of the contract **620** are analyzed based on a parsing function **652** received from a parsing function database **650**, and based on a master contract template **600** from a contract template database **660**. The document analysis engine include a parsing module **612**, a template module **614**, and a preference module **616**.

Portion **624** of the contract **620** is interpreted at the parsing module **612** based on parsing function **652**. A meaning associated with the portion **624** is compared with contract section **602** of the master contract template **600** using template module **614**. As shown in FIG. **6**, contract section **602** is associated with two different condition/action combinations—condition/action A**1** and condition/action A**2**. Condition/action A**1** is selected from the master contract template **600** based on user preferences **618** applied by the preference module **616**. Rather than analyzing the contract **620** based on a customized contract template defined based on a master contract template **600**, the contract **620** is dynamically analyzed based on a combination of a master contract template **600** and user preferences **618**. In some embodiments, the user preference **618** can be a global preference used to define a set of policy preferences.

Portion **622** of the contract **620** is interpreted at the parsing module **612** based on parsing function **652**. In this embodiment, the portion **622** of the contract **620** is not associated with a specific contract section from the master contract template **600**. Because a meaning associated with the portion **622** cannot be compared with any of the contract sections included in the master contract template **600**, a default condition/action is executed.

FIG. **7** is a schematic block diagram that illustrates a document analysis engine **710** configured to communicate with a first entity (entity Y) in response to an analysis of a document **782** requested by a second entity (entity X), according to an embodiment. In some embodiments, the document **782** can be a portion of a document. In this embodiment, the analysis of the document **782** at the document analysis engine **710** is triggered in response to a request **762** from entity X. The document **782** is provided to document analysis engine **710** over a network **770** by the document provider **780**. In some embodiments, the document analysis engine **710** can be configured to perform/trigger an action based on the analysis of the document **782**.

As shown in FIG. **7**, the document analysis engine **710** is configured to send a signal **766** to entity Y in response to the analysis of the document **782** prompted by entity X. In other words the document analysis engine **710** can be configured to send the signal **766** to entity Y even though the analysis of document **782** was triggered by a entity X, which is a different (and/or independent) entity.

In some embodiments, the signal **766** can be related to a notification sent to entity Y based on subscription. In other words, entity Y can subscribe to receive a notification based on a particular event related to a document such as document **782**. In some embodiments, the document analysis engine **710** can be configured to perform (and/or trigger) an action (e.g., ignore, accept) with respect to, for example, document **782** as instructed in a subscription. In some embodiments, the action can be performed (and/or triggered) in lieu of or in addition to the signal **766**.

For example, in some embodiments, entity Y can register (in a subscription) with the document analysis engine **710** to be notified if a change in document **782** is detected. Signal **766** can be sent to entity Y in response to the document analysis engine **710** detecting a change in document **782** (after being prompted by entity X to analyze the document **782**). The change can be detected based on a stored copy (e.g., a cached copy) of the document **782**. The signal **766** can include information related to the change (e.g., types of change(s), assessment of the change (more restrictive language, less restrictive language, etc.)). In some embodiments, the document analysis engine **710** can send a notification to entity Y based on a subscription to receive notifications when changes to any document (or portions of any document) of a certain class are detected.

In some embodiments, document analysis engine **710** can be configured to automatically send a signal **766** (e.g., a notification signal) to entity Y when a document (such as document **782**) that has previously been requested for analysis by entity Y is later analyzed in response to a request from a different entity such as entity X. Specifically, the document analysis engine **710** can be configured to track (e.g., collect, store) information related to document analysis requests by entity Y, and can use that tracked data (also can be referred to as historical data) to later notify entity Y of changes to documents previously requested for analysis. Accordingly, signal **766** can be a signal generated based on historical data related to documents requested for analysis by entity Y. In some embodiments, the document analysis engine **710** can be configured to notify entity Y when a change has been made to a document previously requested for analysis by entity Y. In some embodiments, the document analysis engine **710** can provide an assessment of the change based on a cached copy of the document. The document analysis engine **710** can be configured to store the tracked data in, for example, a local memory (not shown) and/or a remote database (not shown).

In some embodiments, threshold conditions related to notifications can be defined by entity Y. For example, entity Y can subscribe to receive notifications only when more than a specified percentage of document **782** has changed or only when a specified portion (e.g., set of sections) of the document have change **782**. In some embodiments, entity Y can subscribe to receive notifications only when more than a specified percentage of document **782** has changed or only when a specified portion (e.g., set of sections) of the document **782** has changed.

FIG. **8** is a flowchart that illustrates a method for analyzing a portion of a contract in response to an update request, according to an embodiment. As shown in FIG. **8**, at least a portion of a contract is received at a document analysis engine in response to an update request. The update request can be a request to determine if a particular document, such as a EULA associated with a particular website, has changed since last analyzed (as indicated in historical data tracked by, for example, a document analysis engine).

At **810**, the document analysis engine is configured to determine that the portion of the contract has changed. The change in the document can be determined based on historical data stored at the document analysis engine. For example, in some embodiments, the portion of the contract can be compared with an image (e.g., a copy) of the portion of the contract stored at the document analysis engine (or at a different location by the document analysis engine).

The portion of the contract is analyzed based on a contract template and based on a parsing function at **820**. The contract template and/or the parsing function can be retrieved by, for example, the document analysis engine based on a contract type associated with the portion of the contract.

In some embodiments, if a change in the portion of the document is not detected, the document may not be analyzed based on the contract template and/or based on the parsing function. In other words, no action may be taken if a change in the portion of the document is not detected. In some embodiments, for example, the document analysis engine can be configured to log (e.g., record/store a date-time stamp) the processing of the portion of the document and/or cache a copy of the document to build a history for future analysis related to changes to the portion of the document.

An action is performed in response to the analysis at **830**. In some embodiments, for example, a user can be notified of details of the differences between the updated portion of the document and the previous image of the portion of the document (or one or more historical copies of the portion of the document). In some embodiments, a user can be prevented from later accessing target content associated with the document based on the analysis. In other words, the analysis can be stored in a memory and used to block access when the target content is later requested.

FIG. **9** is a schematic graph that illustrates a trend of two policy metrics—metric **920** and metric **930**—versus time, according to an embodiment. The policy metrics can be metrics used to illustrate changes made to a documents over time. For example, policy metric **920** can be related a level of restrictions within a document (e.g., nature of terms within a EULA) over time, and policy metric **930** can be related to a percentage of change (on a word-by-word basis) to a document over time. A document analysis engine can be configured to use historical data related to analysis of one or more documents (e.g., interpretations of the documents) to produce the graph.

Some embodiments described herein relate to a computer storage product with a computer-readable medium (also can be referred to as a processor-readable medium) having instructions or computer code thereon for performing various computer-implemented operations. The media and computer code (also can be referred to as code) may be those designed and constructed for the specific purpose or purposes. Examples of computer-readable media include, but are not limited to: magnetic storage media such as hard disks, floppy disks, and magnetic tape; optical storage media such as Compact Disc/Digital Video Discs (CD/DVDs), Compact Disc-Read Only Memories (CD-ROMs), and holographic devices; magneto-optical storage media such as optical disks; carrier wave processing systems; and hardware devices that are specially configured to store and execute program code, such as Application-Specific Integrated Circuits (ASICs), Programmable Logic Devices (PLDs), and Read-Only Memory (ROM) and Random-Access Memory devices. Examples of computer code include, but are not limited to, micro-code or micro-instructions, machine instructions, such as produced by a compiler, code used to produce a web service, and files containing higher-level instructions that are executed by a computer using an interpreter. For example, embodiments may be implemented using Java, C++, or other programming languages (e.g., object-oriented programming languages) and development tools. Additional examples of computer code include, but are not limited to, control signals, encrypted code, and compressed code.

While various embodiments have been described above, it should be understood that they have been presented by way of example only, not limitation, and various changes in form and details may be made. Any portion of the apparatus and/or methods described herein may be combined in any combination, except mutually exclusive combinations. The embodiments described herein can include various combinations and/or sub-combinations of the functions, components and/or features of the different embodiments described. For example, any of the embodiments which were described in the context of contract analysis can be generally applied to the analysis of any type of document.

What is claimed is:

1. A method, comprising:
receiving a portion of text from a document;
associating a document type with the document based on at least one of the portion of text or an identifier associated with the document; and
selecting, based on the document type, a document template having a plurality of sections, each section from the plurality of sections being associated with a document category, at least one section from the plurality of sections being associated with at least one policy preference.

2. The method of claim **1**, further comprising:
determining a meaning for the portion of text based on an ontology having at least a portion associated with the document type.

3. The method of claim **1**, further comprising:
determining a meaning for the portion of text based on a set of semantic rules associated with the document type; and
associating the portion of text with at least one section from the plurality of sections based on the meaning.

4. The method of claim **1**, further comprising:
determining a meaning for the portion of text;
associating the portion of text with a section from the plurality of sections based on the meaning; and
sending an indicator when the meaning satisfies a condition associated with a policy preference of the section from the plurality of sections.

5. The method of claim **1**, further comprising:
determining a meaning for the portion of text; and
sending an indicator to an entity when the portion of text is not associated with at least one section from the plurality of sections.

6. The method of claim **1**, further comprising:
determining a meaning for the portion of text based on an ontology having at least a portion associated with the document type; and
associating the meaning with a section from the plurality of sections and with a policy preference included in the section.

7. The method of claim **1**, wherein a policy preference included in a section from the plurality of sections is selected by a user from a set of policy preferences associated with the section from the plurality of sections.

8. The method of claim **1**, wherein the receiving includes receiving in response to a request to access content associated with the document.

9. The method of claim **1**, wherein the document template is defined at least in part based on a global template selected by an entity.

10. The method of claim **1**, wherein the document template is at least one of a privacy-related contract template, an end-user-license agreement template, a terms and conditions contract template, a lease contract template, or a real property contract template.

11. The method of claim 1, wherein the receiving includes receiving in response to a request to access content associated with the document,

the method, further comprising:

analyzing the portion of text from the document based on the document template; and

blocking transmission of at least a portion of the content based on the analyzing.

12. The method of claim 1, wherein the receiving includes receiving in response to a request to access content associated with the document, the selecting includes selecting based on a transactional valuation associated with the content.

13. The method of claim 1, wherein the at least one policy preference is a default policy preference.

14. The method of claim 1, wherein the document is a contract.

15. A processor-readable medium storing code representing instructions to cause a processor to perform a process, the code comprising code to:

receive a term from a document;

determine a document type based on at least one of the term or an identifier associated with the document;

analyze the term based on a set of semantic rules associated with the document type and based on a document template associated with the document type; and

determine whether the term is an acceptable term based on the analyzing.

16. The processor-readable medium of claim 15, wherein at least one of the set of semantic rules or the document policy is selected based on the document type.

17. The processor-readable medium of claim 15, further comprising code to:

provide a set of policy preferences associated with a master document template to a user, at least a portion of the document template is defined based on a policy preference selected from the set of policy preferences.

18. The processor-readable medium of claim 15, wherein the term is a first term,

the code further comprising code to:

send an indicator to a user that a second term from the document is not associated with a document category from the document template.

19. The processor-readable medium of claim 15, wherein the term is a first term,

the code further comprising code to:

send an indicator to a user that a second term from the document satisfies a manual review condition.

20. A method, comprising:

receiving at least a portion of text from a document in response to a policy update request;

determining that the document has a changed portion based on a version of the document stored in a database and based on the portion of text from the document; and

analyzing the changed portion of the document based on a document template, the document template being selected from a plurality of document templates based on a document type associated with the document.

21. The method of claim 20, wherein the version of the document is stored in the database prior to the receiving.

22. The method of claim 20, wherein the analyzing includes analyzing based on a policy preference.

23. The method of claim 20, wherein the policy update request is triggered by a first entity, the policy preference has a portion defined by the first entity,

the method further comprising:

sending to a second entity a notification of the changed portion in response to the determining.

24. The method of claim 20, the policy update request is triggered by a first entity, the policy preference has a portion defined by the first entity

the method further comprising:

analyzing, in response to the determining, the changed portion of the document based on a policy preference having a portion defined by a second entity; and

sending an acceptance indicator in response to the analyzing based on the policy preference associated with the second entity.

25. The method of claim 20, wherein the document policy includes a set of sections, the analyzing includes associating the changed portion of the document with a section from the set of sections.

26. The method of claim 20, wherein the analyzing includes analyzing based on a set of semantic rules selected based on the document type and an ontology having at least a portion associated with the document type.

27. The method of claim 20, wherein the policy update request is defined in response to a request to access content associated with the document.

28. The method of claim 20, further comprising:

updating the version of the document stored in the database in response to the determining.

29. The method of claim 20, further comprising:

defining a policy metric trend based on the analyzing.

30. A method, comprising:

selecting, based on a document type, a document template having a plurality of sections, each section from the plurality of sections being associated with a document category and including at least one policy preference; and

defining a text of a document based on the document template.

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